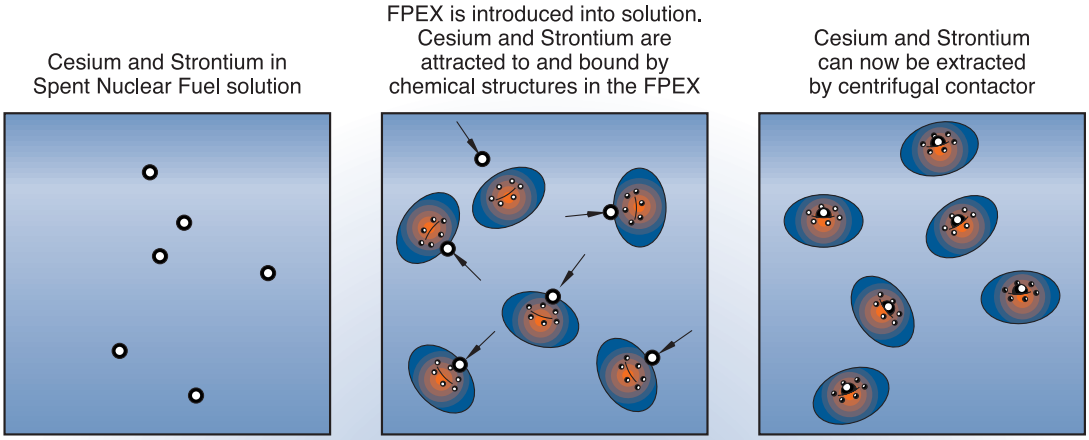

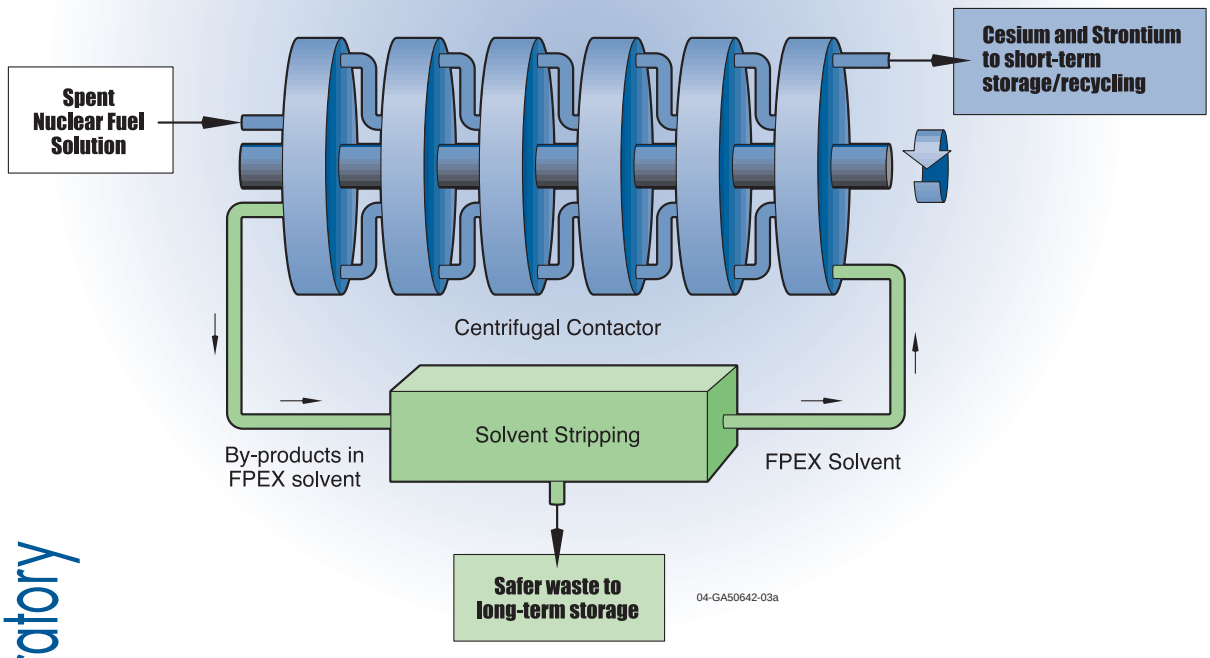

Idaho National Laboratory

Fission Product Extraction Process

Removing cesium and strontium from spent nuclear fuel

Historically, progress in the world is marked by the development of key technologies. Antiquated methods are replaced by technologically superior products and processes like internal combustion engines, microwave communications, fiber optics, ultra-strong ceramics and digital systems.

As global growth in energy demand continues a steep climb, researchers at the Idaho National Laboratory are inventing key technologies for using nuclear energy. Now, they have developed the Fission Product Extraction Process – also called FPEX.

FPEX is a key process that simultaneously and synergistically extracts cesium and

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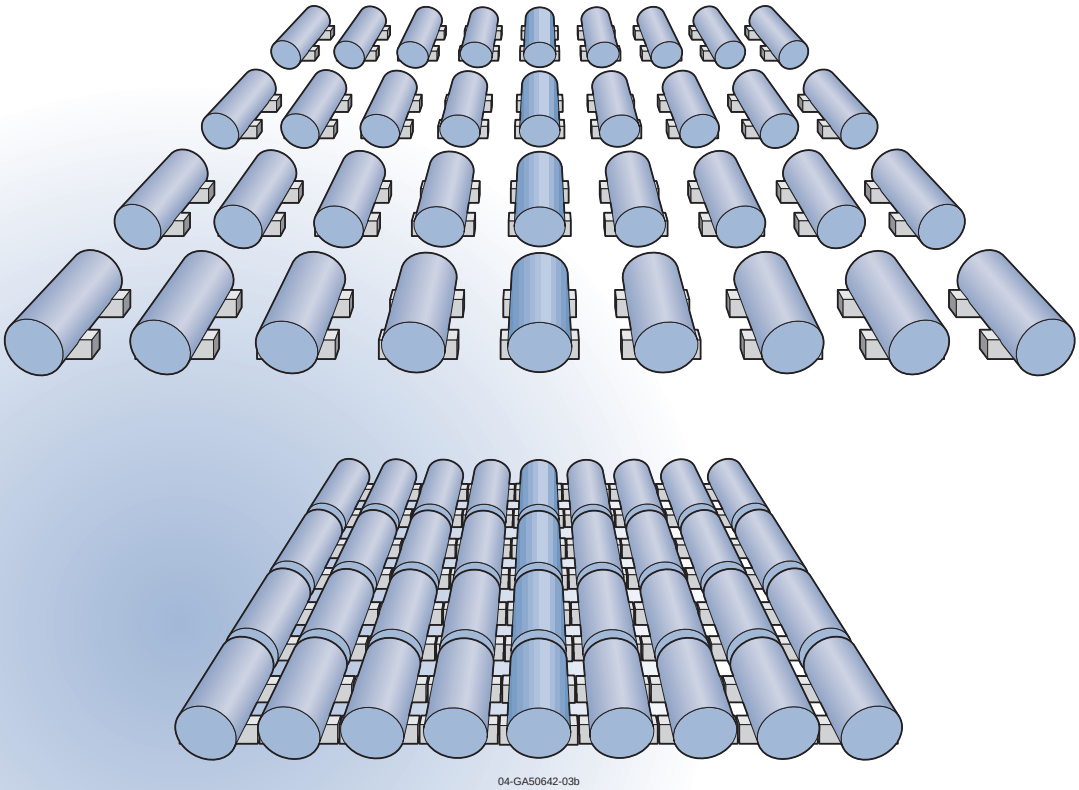
Inefficient Waste Storage

Currently, spent nuclear fuel must be stored in a spread-out fashion to prevent the build-up of heat from the decay of cesium and strontium. This consumes huge quantities of expensive repository space.

Efficient Waste Storage

FPEX makes it practical to remove cesium and strontium from spent nuclear fuel, making it possible to store ten times the amount of waste in a given storage repository.



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strontium from spent nuclear fuel. Using an environmentally friendly and commercially available solvent, FPEX removes these two valuable elements for commercial reuse. In doing so, it will make significant environmental and economic contributions to global energy production as well.

Strontium isotopes are widely used in medical research and thermal energy applications for daily and emergent power in remote areas. Cesium may prove very valuable in radiation processing of natural and synthetic materials, creating agricultural soil conditioners and fertilizers, as well as disinfecting water and food.

Not only are the two elements recyclable with the FPEX process, but the solvent also is reusable. Until now, processes normally extracted these elements one at a time, doubling processing time, labor, risk to workers, and cost. FPEX extracts both cesium and strontium in a single process, but delivers significant benefits beyond efficient processing.

A key issue for nuclear power electrical generation is the management and storage of spent nuclear fuel. While removing valuable atomic isotopes for productive use, FPEX improves the storage situation by a factor of 10.

Removal of plutonium, uranium and americium from spent nuclear fuel occurs during reprocessing (using the PUREX process, for instance). FPEX then removes the cesium and strontium for recycling. This virtually eliminates heat sources in the material to be stored, allowing extensive reductions in both the space and time required for storage. This breakthrough alone could extend the life of America's planned national repository at Yucca Mountain Nevada from 30 years (current estimated time before facility is full) to 300 years.

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